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ABSTRACT

This report provides preliminary findings and a summary of study activities for Stage I of a project that examined public library Internet services that could impact the Digital Divide. The first section discusses the E-rate program and the Digital Divide, including closing the gap in the Digital Divide and public library Internet connectivity and the Digital Divide. Stage I tasks and objectives are presented in the second section, including assessing various data sources that describe the pubic library's role and impacts on the Digital Divide and conducting preliminary site-based data collection at selected state libraries, public libraries, and consortia. The third section assesses databases as per their usefulness in describing public library Internet services and their impact on the Digital Divide. Data collection at selected state libraries and public libraries is described in the fourth section, including objectives, selecting the states, key findings, importance of leveraged funding, impacts and benefits, issues and barriers, and possible models. The final section considers the next steps for the project. Appendices include a report on available data from the Schools and Libraries Division and the Gates Technology Inventory, a chart of research questions and study areas, and preliminary impact models of public library Internet and technology infrastructure funding. (MES)

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PUBLIC LIBRARY INTERNET SERVICES: IMPACTS ON THE DIGITAL DIVIDE

Stage I Final Report

August 20, 2000

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Overview

Overall, Stage I of the research study has been completed successfully. The most important conclusion from Stage I is that the remainder of the study can be implemented with very few changes or modifications. Moreover, Stage I findings suggest that there are a range of data that can be obtained to assess impacts from programs such as the E-rate, the Gates Foundation Awards, and Library Services and Technology Act on public libraries' efforts to reduce the digital divide.

The investigators spent considerable time and effort attempting to obtain various data sets that might help describe public library Internet services that could impact the Digital Divide. These efforts resulted in a range of issues in simply obtaining the various datasets, to say nothing of actually being able to analyze the data in the datasets. Although some progress has been made to obtain access to these datasets – and it seems likely that we will obtain these datasets in the future – it is unclear how useful the data would be in answering study research questions.

The investigators completed the site visits in Florida at the state library, a rural regional library system, and two large urban library systems. They also conducted a group interview with the state librarian and other librarians from the state of Colorado.

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These visits and interviews have been extremely helpful in addressing Stage I tasks and objectives. The site visits also demonstrate the wealth of information and data available at state libraries and local public libraries regarding project research questions.

Background

This report provides preliminary findings and a summary of study activities March-August, 2000. Additional background information regarding the study can be found in the original study proposal (February 7, 2000) and the paper titled *Project Methodology* (April 17, 2000) – previously submitted to ALA Washington Office by the investigators. It should be remembered that only Stage I of the project has been funded and that this report summarizes activities related only to that Stage. This report also constitutes the final deliverable for Stage I as described in the contract dated March 2, 2000 between ALA and the investigators.

E-rate and the Digital Divide

There is a wealth of literature describing the E-rate program as well as aspects and issues related to the Digital Divide. The purpose of this section is to provide a brief introduction to selected sources for background and not to provide a comprehensive literature review.

E-rate

The Telecommunications Act of 1996 (P.L. 104-104) laid the groundwork for the establishment of the E-rate – a means by which the federal government would provide discounts to reimburse schools and libraries for various types of expenditures related to connecting to and using the Internet – as one means through which to guard against a digital divide fostered by technology "haves" and "have nots." As of November 1999 some $1,927,274,194.88 in discounts had been committed to reimburse schools and libraries based on applications filed by these schools and libraries (see http://www.sl.universalservice.org/apply/fcyear2/national.asp> for details). Additional background information about the E-rate and its administration can be found at <http://www.universalservice.org/>.

Schools, for example, have made some effort to determine the impact of the E-rate on a range of educational objectives. EdLinc recently released a report, *E-rate: Keeping the Promise to Connect Kids and Communities to the Future*, that documented a number of case studies describing a range of benefits to students, communities, learning, etc. <http://www.edlinc.org>. This report also included some case studies describing impacts and benefits of the E-rate on public libraries. As noted later, the Department of Education has contracted with the Urban Institute to conduct a major assessment of the impact of the E-rate on schools – but data have not resulted as yet.

The E-rate has not evolved without significant controversy. The U.S. General Accounting Office was asked to review the program and published the report *Telecommunications Technology: Federal Funding for Schools and Libraries* (GAO, 2000). The report described a number of issues and potential problems affecting the E-rate program. Another useful summary of the various E-rate program issues appeared in a report issue by the Congressional Research Service, *Telecommunications Discounts for Schools and Libraries: The E-rate Program and Controversies* (CRS, 1999 and updates). Suffice to say that the E-rate program has become highly politicized despite the limited availability of data and information to accurately describe the impact and benefits of the program.

Digital Divide

The Digital Divide is a phrase initially used in 1995 by the Department of Commerce's National Telecommunications and Information Administration (NTIA) to describe the existence of "haves" and "have nots" in the networked environment. NTIA, through its 1995 report *Falling Through the Net: A Survey of the "Have Nots" in Rural and Urban America*, demonstrated that there were clear differences in access to technology (e.g., computers, computers with modems) across households by race, income, education, and geographic location. Indeed, minority households, households with less than the median income, households with non-college educated individuals, or households located in rural areas were less likely to have computers in the home.

NTIA issued two additional reports documenting the existence of a Digital Divide: *Falling Through the Net II: New Data on the Digital Divide* (1998) and *Falling Through the Net: Defining the Digital Divide* (1999). In these reports, NTIA evolved a definition of the Digital Divide as "the divide between those with access to new technologies and those without" (1999, p. xii) and considers the Digital Divide to be "one of America's leading economic and civil rights issues" (1999, p. xii).

In the 1999 *Falling Through the Net* report, NTIA found that (p. xiii):

- Households with incomes of $75,000 and higher are more than twenty times more likely to have access to the Internet that those at the lowest income levels, and more than nine times as likely to have a computer at home;
- Whites are more likely to have access to the Internet from home than Blacks or Hispanics have from any location;
- Black and Hispanic households are approximately one-third as likely to have home Internet access as households of Asian/Pacific Islander descent, and roughly two-fifths as likely as White households; and
- Regardless of income level, Americans living in rural areas are lagging behind in Internet access.

Thus, there is a discrepancy in access to network-based technologies by race, income, and geographic location.

A key issue raised in the 1999 NTIA report is that of the role that community access centers (CACs) – defined as schools, libraries, and other public access points – play in ameliorating the Digital Divide. It is important to consider the role, ability, and potential of CACs in the Digital Divide.

Closing the Gap

It is clear that the Digital Divide will not simply disappear over time without effort on the part of various community-based organizations, including public libraries. Indeed, the 1999 NTIA report states that "for many groups, the digital divide has widened as the information "haves" outpace the "have nots" in gaining access to electronic resources" (p. xiii).

What are some efforts/potential efforts to close the gap in the Digital Divide? Below are some examples of current efforts that attempt to close the gap:

- Gates Library Foundation (http://www.glf.org/). This program provides public libraries with computer and networking equipment as well as software, training, and technical support. The GLF initiative targets entire states and library systems within those states that serve impoverished communities. Thus far, the program has committed over $70 million to libraries in the U.S., as well as $17 million to libraries in Canada.
- PowerUp (http://www.powerup.org/). PowerUp, through a partnership of foundations and corporations, seeks to bring access to the Internet and technology through CACs (e.g., Boys/Girls Clubs). PowerUp is a relatively new initiative with key partners such as America Online, Sun Microsystems, Microsoft, and the YMCA.
- E-rate (http://www.sl.universalservice.org/). Created as part of the Telecommunications Act of 1996 (P.L. 104-104), the E-rate provides discounts that range from 20-90% to schools and libraries on telecommunications costs, internal wiring, and communications equipment. Schools and libraries receive their discounts based on their poverty status (measured by the percentage of students eligible for school lunch programs) and metropolitan status (urban or rural).
- World Economic Forum (http://www.weforum.org). The Forum has proposed a Global Digital Divide Initiative and has offered a number of strategies rapid technological improvements throughout the world. These strategies were presented at the G-8 Kyushu-Okinawa Summit July 21-22, 2000.

Other initiatives exist, but all have a common goal: to provide access to emerging technologies to communities regardless of race, education, income, or location.

Public Library Internet Connectivity and the Digital Divide

In this mix it is important to assess the role that public libraries play in the Digital Divide, as well as the use of E-rate funding to support public library involvement with

and use of the Internet. Current research by the authors shows that 95.4% of public library outlets provide public access Internet services (Bertot and McClure, 2000). Of those outlets that do provide public access Internet services, each outlet has an average of 8.3 graphical workstations – but rural libraries have an average of 4.9 workstations as compared to an average of 17.3 in urban libraries. Moreover, 25.3% of rural public libraries connect to the Internet via a dial-up 56kbps modem. The same study shows that 62.1% and 69.6%, respectively, of library outlet with 20-40% poverty and more than 40% poverty designations make use of the E-rate discount to support their Internet connectivity services. It is clear, therefore, that (1) public library Internet connectivity – while improved substantially since 1998 (Bertot and McClure, 1998) – still requires improvement – especially in terms of higher bandwidth – to provide adequate access to Internet-based technologies to the public, and (2) public libraries, particularly those that serve impoverished communities, make significant use of E-rate discounts to support their Internet connectivity.

The Clinton administration has been a strong supporter of closing the Digital Divide. In President Clinton's "Call to Action to Close the Digital Divide" (2000) he stated:

> Our mission is to open the digital frontier to all Americans, regardless of income, education, geography, disability or race… If we work together to close the digital divide, technology can be the greatest equalizing force our society or any other has even known.

He then outlined a range of initiatives to support this call for action. But the strategies did not include proposals for how public libraries might participate in such a national effort. In short, public libraries have received limited attention at the national level as key players in addressing digital divide issues. Given this limited attention to public libraries, the research agenda outlined here takes on increased significance.

Stage I Tasks and Objectives

There were two main areas of work to be done in Stage I. The first objective is as follows:

- Assess various data sources that describe public library's role and impacts on the Digital Divide. These include:
  - School Library Division (SLD) databases that can be made available to the investigators,
  - Department of Education data that becomes available or results from *Evaluation of Educational Technology Policy and Practice for the 21st Century* being conducted by the Urban Institute,
  - Gates Foundation state-based Technology Surveys (currently completed for 33 states),

- National Telecommunications and Information Administration (NTIA) *Falling through the Net III: Defining the Digital Divide* database (produced by the U.S. Census),
- Library Services and Technology Act (LSTA) awards to State Libraries which are then awarded to individual libraries and consortia, and
- Local support from the city, town, municipality, or county that are used to support roles and impacts on the Digital Divide.

The second key work area was:

- Conduct preliminary site-based data collection at selected state libraries, public libraries, and consortia to

  - determine the range and type of data available at these organizations that describe the library's role and impact on the Digital Divide, and
  - determine the degree to which the available data can be "unbundled" or linked to specific streams of funding support that have been made available to the library.

Work was concentrated initially in the assessment of the various databases and continued throughout Stage I. Indeed, a considerable amount of total project time was spent on attempting to *obtain* the various databases.

To date, only very limited assessment of the databases has occurred as we are still in the process of trying to obtain databases from the School Library Division (SLD). We only obtained a complete set of datasets from the Gates Foundation as of the end of June 2000. Planning for the site-based data collection efforts began in April 2000 with the first state completed in May and a second completed in July 2000.

Database Assessment

As outlined above, the investigators explored the accessibility of a number of databases as per their usefulness in describing public library Internet services and their impact on the Digital Divide.

School Library Division (SLD) Databases

The SLD maintains a number of databases that describe school and library applications for E-rate discounts and awards made under the E-rate program. The SLD has data available from Year 1, Year 2 (partially), and is beginning to have data for Year 3 awards (these include data from forms 470, 471, and 486). Some of the data is made publicly available on the SLD website at <http://www.sl.universalservice.org/>. The more useful data that describes specific types of technology requests and actual awards is not made available to the public but is retained by the SLD.

During Stage I, the investigators invested a *significant* level of effort in working with the ALA Washington Office and the Department of Education to obtain access to the range of SLD databases. Interestingly, these databases have been made available to the Department of Education for a study contracted to the Urban Institute by that agency with the objective of assessing the impact of the E-rate on schools.

After six months of effort, two meetings in Washington, D.C. among McClure, ALA Washington Office Staff Shirley, and representatives of the Department of Education; a number of discussions among the investigators and Shirley with staff at the Urban Institute; additional meetings in Washington, D.C. between McClure and ALA staff; various conference calls among the investigators and ALA staff and others; and significant ongoing efforts on the part of ALA Washington Office staff working with the SLD, *we now expect to have access to the SLD datasets in September, 2000.*

Since the investigators have not been able to acquire or access the SLD databasets (which are said to be extensive) we can make limited assessments as to their usefulness to answer research questions outlined in the project proposal. Early in August 2000 we were provided with some information about the content of selected datasets and were asked which variables might be of interest to this study. With the assistance of the ALA Washington Office a reply/request was made for data related to a number of specific variables.

We do know that some considerable effort has been made by the Urban Institute to "clean up" and "organize" the datasets so they can be analyzed. We also know that there are various ID numbers that the Urban Institute has had to develop and assign to the libraries and schools to complete their analysis of the datasets. Further, some effort was made on the part of the Urban Institute to link information from the SLD datasets to other datasets. The investigators, however, have been told (after some initial discussions) that all future requests and discussions should be directed first through the ALA Washington Office, OITP, and then to the Department of Education.

Given the issues encountered, in June 2000, the investigators and ALA staff changed the study focus from assessing the SLD databases to which the Department of Education has access, and attempted a preliminary assessment of the usefulness of the data publicly available at the SLD website. Appendix A provides this preliminary assessment of the publicly available SLD data, discusses some key issues related to these datasets, and offers recommendations for future work. We anticipate conducting additional analysis of the SLD datasets (both the public datasets and those yet to be obtained) during Stage II and expect that we will also be given access to the various SLD datasets that pertain to public libraries.

Department of Education Data that Results from *Evaluation of Educational Technology Policy and Practice for the 21st Century* Conducted by the Urban Institute

The Department of Education contracted with the Urban Institute for a major study in which data regarding impacts of the E-rate on schools will be investigated. Two aspects of this study are of interest to the effort we are completing for the ALA Washington Office:

- *The SLD Databases*. The Department of Education has obtained access to a range of SLD databases describing the demographics, applications, and discounts (awards) made to schools and libraries. Since the databases include data for both schools and libraries, they are of considerable interest to our project. At this time, however, the content of these datasets is not clear. Nonetheless, the investigators have invested significant time and effort to obtain access to these datasets. There continues to be ongoing efforts on the part of ALA Washington Office to obtain access to these datasets.

- *National Survey*. During Fall 2000 the Urban Institute will mount a national survey of K-12 schools, school districts, and school consortia. One aspect of this survey is to obtain data that describe the impact of the E-rate discounts. The representatives of the Urban Institute and the Department of Education had limited familiarity with school media libraries. Thus, the investigators and ALA staffer Shirley have worked with them to describe the role of the school media center and assist them in survey design to include questions related to the impact of the E-rate on the school media library and learning/instruction in general. The investigators have reviewed a number of drafts of these surveys.

Although the investigators had not been tasked with assisting the Department of Education in the development of their national survey, it was clear that such involvement would result in data describing the impact of E-rate on school media centers that would benefit ALA and school librarians.

At one point we were under the impression that the Urban Institute would provide the project with analyses from the SLD datasets related to public libraries and the E-rate. Specifically, they initially agreed to provide us with the following analyses:

1. Analysis of library discounts (a) received by and (b) applied for by population of legal service area, urban/rural classification, and poverty.
2. Analysis of amount requested by applicant type (school library consortia, library, school) by population of legal service area, urban/rural classification, and poverty.
3. Analysis of library application rejections by population of legal service area, urban/rural classification, and poverty.
4. Analysis of service type requested by population of legal service area, urban/rural classification, and poverty.

5. Analysis of committed discounts by state and libraries within states by population of legal service area, urban/rural classification, and poverty.

Over the course of a number of meetings with the Department of Education conducting such an analysis has been discussed on numerous occasions. As of this writing, however, it is unclear if such analyses will, in fact, be performed by the Urban Institute for the ALA project.

Gates Foundation State-based Technology Surveys

During March, the investigators initiated discussions with representatives from the Gates Foundation to obtain copies of the technology surveys that the Foundation conducts as a basis for determining the type and level of awards to be made in each of the states in which they have determined to provide awards. After some additional discussions with the Gates Foundation regarding a range of issues related to access and use of the datasets, the investigators and ALA staffer Shirley held a conference call on April 20 with two representatives of Gates to better understand the nature of these datasets and their availability.

The conference call determined that the Gates Foundation had (at that time) completed technology surveys for 33 states. The technology surveys used in Round 1 varied and evolved over time; surveys used in Round 2 and 3 were relatively stable in terms of content and allow for some comparability. The size and accuracy of these files, we were told, varied. For example, the California dataset is quite large (1100 libraries) compared to that from Idaho. Although the surveys were self-reported, there was follow-up with the libraries by both Gates and the state library – thus, there is a sense that the quality of the data is quite good. The content of the databases may be dated, however, since the surveys began in 1998.

We also determined that there is an "Awards" dataset for each of the states that have received awards. These datasets are not available for all 33 states as some states are only beginning the process. We were told that we could receive the awards datasets for the states in which we would be conducting the site-based data collection.

As a result of the conference call, Gates' representatives agreed to send us copies of the technology surveys for each of the 33 states. They also have sent the Awards dataset for the state of Florida. Apparently, some editing and reorganization of the original files were needed before they could be sent as email attachments in the form of an Access data file. Thus, the study team dedicated a significant level of effort to working with various representatives of the Gates Foundation to (1) obtain permission to have copies of the datasets, and (2) secure the actual copies of the datasets.

By the end of June the study team had received the state technology survey data files. Appendix A provides a preliminary analysis of the usefulness of the Gates technology surveys for addressing various research questions developed for this project.

National Telecommunications and Information Administration (NTIA)
Falling through the Net III: Defining the Digital Divide (DDD) Database
(Produced by the U.S. Census)

During the project, minimal attention was given to an assessment of the data in the DDD database. Initially there was some confusion on the part of representatives at NTIA on the availability of the dataset that produced that final report. Once we obtained (correct) ordering information from the Bureau of Census we found that the dataset was available on CD-ROM for $150. A phone order was placed to purchase a copy of the CD the end of April. We then determined that the order was either lost or misplaced toward the end of May. Given the time commitments to accessing the SLD and Gates datasets we did not pursue analysis of the DDD database.

Thus, we are unable to make any assessment of the usefulness of the NTIA dataset that produced DDD. We have reviewed the hardcopy of the DDD report. Only Charts II-16, 17, 20-23 refer directly to public libraries by discussing demographics of persons using the Internet outside the home – in which the public library is one such location. While these charts are of interest, they appear to be the only charts that specifically reference public libraries.

Thus, key questions are to determine (1) the degree to which additional data manipulation in the actual database could produce any other findings more directly related to the role of public libraries in the Digital Divide, and (2) if data from the DDD dataset can be linked to data from other datasets (e.g. the SLD datasets) to obtain additional findings. A copy of the report and selected data can be found at <http://www.ntia.doc.gov>. During Stage II additional effort can be committed to assessing the NTIA DDD dataset.

Library Services and Technology Act (LSTA) Awards

The Institute for Museum and Library Services (IMLS) administers LSTA awards to the State Libraries. The awards are formula based. These awards, once received by the state library are then allocated to various projects and priorities given the state library's statewide plan.

During a number of phone conversations and email with representatives at IMLS, we learned about the various awards process and were directed to a range of data on the Institute's webpage <http://www.imls.gov> that described the awards provided to various recipients under the programs administered by IMLS. We also attempted to learn if IMLS could provide some type of analysis of the type of awards provided by each of the state libraries. We learned that in the state library's annual report to IMLS there may be some typology that was used (although it could vary from state to state) that described the types of awards made within the state, e.g., telecommunications, hardware, training, etc.

When asked if IMLS could provide us with a summary and breakdown of these awards based on the annual reports the response was non-committal. They indicated a need to investigate the matter further to determine if such an analysis could be done and at what level of effort. After some additional emails, they had not been able to address this request. We have not followed up on this request due to the commitment of time given to obtaining access to the SLD and Gates datasets.

The site visit at the Florida state library demonstrated that the state library maintained detailed records of LSTA awards in terms of:

- Project summary
- Project cost and proposed budget
- Type of project in terms of various aspects of technology enhancement
- Evaluation efforts.

Similar detailed information on LSTA awards are available from the Colorado State Library.

Thus, it would be a matter of brute force to go through the various awards, for all states, for each year and describe what amounts of monies went for what types of technology enhancements and to which libraries/library systems. A representative at the Florida state library indicated that some work might be needed to better define/describe the typology of awards in terms of technology enhancements but thought that such could be done. He also suggested that all state libraries would likely have this level of detailed records for the LSTA awards. Again, this is an area that may be pursued further in Stage II.

Local Support from the City, Town, Municipality, or County

At the site-based data collection effort at three library systems in Florida (one rural and two urban), the investigators were very impressed with the ability of the libraries to identify specific technology expenditures from the various local, city, town, county, or municipality. The states of Florida and Colorado have quite stringent and explicit financial management requirements. Thus, there was considerable level of detail that could be provided about what local sources (including gifts) were expended on what specific technology. Less clear, however, was making one-to-one relationships between the expenditure and specific benefits or impacts. Nonetheless, the investigators found very good records and information describing expenditures for technology-based services, infrastructure, and resources.

Data Collection at Selected
State Libraries and Public Libraries

The April 17, 2000 *Project Methodology* paper describes the approach used by the investigators to conduct the preliminary site-based data collection effort and will not be

repeated here. Some modifications occurred from the initial approach proposed there, but generally, these modifications were minor.

The first state to participate in the site-based data collection was Florida. The investigators conducted half-day site visits at the state library, Suwannee Regional Library System (rural), Tampa-Hillsborough County Public Library System, and a conference call with staff at Broward County Library (Ft. Lauderdale). The study team also conducted a focus group with eight Colorado participants from various library settings throughout the state – the State Library, public libraries, regional libraries, and school media centers. The focus group occurred during the 2000 American Library Association annual conference in Chicago, Illinois. In both instances the investigators reviewed a range of reports and information related to technology public library infrastructure and digital divide issues.

Objectives

Overall, this data collection effort sought to understand:

- **Impact** of various funding initiatives on the state's library Internet connectivity and IT infrastructure. Focus group participants were asked to provide an assessment of LSTA, E-rate, Gates, and other funding mechanisms in relation to the connectivity and IT situation in their libraries.
- **Uniqueness** of the application for, deployment of, and implementation of various funding initiatives available to libraries in the state. For example, was there a statewide effort to assist schools and libraries apply for the E-rate? If so, what were the characteristics of that effort?
- **Benefits** of connectivity and funding for connectivity to the participants' libraries and/or agencies.
- **Barriers** encountered in developing technology plans, applying for funding, receiving funds, and implementing the Internet technologies in their libraries.
- **Unbundling** the various expenditure streams from the funding sources as well as linking specific technology expenditures to benefits and impacts.
- **Participants' assessment** of the processes for awards via the SLD, Gates, and LSTA.

These general topics became springboards from which other areas of interest could be probed and explored. More specifically the investigators wanted to determine the degree to which the data sources listed in Table 1 of the February 7, 2000 proposal could be obtained (see Appendix B: Proposed Study Research Areas, Research Questions, and Data Sources).

Selecting the States

Colorado and Florida libraries demonstrated substantial ability and success in a number of areas related to gaining and leveraging Internet connectivity and IT infrastructure funding. Also, they have a unique geography and mix of libraries that

could inform this study's ability to assess public library involvement in the Digital Divide. Factors considered for selected these states included:

- **State library leadership role**. The State Libraries provided substantial leadership on multiple fronts to assist libraries participate in Internet and technology grant/funding opportunities.
- **Geography**. The states faced substantial challenges in enhancing the connectivity of its libraries, as many of these state's libraries were rural in nature and dispersed throughout the state.
- **People**. Both states serve a number of populations considered the digital "have nots", and thus provide a window into meeting the connectivity and technology needs of those populations.
- **Aggressiveness**. Both state libraries pursued aggressively E-rate funding from the beginning of that program.
- **Collection of statistics**. Both Florida and Colorado are leading states in their collection, analysis, and use of public library and school media center statistics. As such, they have a number of datasets that measure Internet connectivity and IT infrastructure in those settings.

Together, these factors led to the study team's desire to include Colorado and Florida libraries in the data collection phase of this study.

Overview of Key Findings

The site-based data collection efforts and the focus group were very productive and informative in terms of addressing the general topics outlined in the paragraph above. The investigators were most impressed with the knowledge of the participants, their in-house records, and their insights as to the benefits and impacts from the various technology revenue streams that they had received. The site visits and focus group suggest that most of the topics identified in the matrix described in Appendix B can be addressed in future work.

Some of the libraries provided the investigators with detailed lists of expenditures for the previous two years broken down by each of the various technology revenue streams. In one case the library system believed that they could link specific impacts and benefits to specific expenditures with some additional work and data collection. In all instances the participants provided considerable expertise and information that leads the investigators to believe that many of the research questions listed in Appendix B could be addressed successfully in a full blown study.

Based on the site visits and group discussions completed thus far, the following *preliminary* findings can be offered:

- 1998-2000 has been a unique time period for public library information technology infrastructure development because of the E-rate, LSTA, and the

Gates Foundation awards: E-rate promoted infrastructure and telecommunications, LSTA promoted program development, and Gates provided necessary hardware and software. The combination of these three programs at the same time, as one library director commented, "has had an unparalleled impact on improving our library."

- The E-rate, LSTA, Gates awards, and local resources have been innovatively leveraged by local libraries to make huge gains in the library's information technology information structure and networked based services and resources.
- These various programs have spawned a number of new and innovative partnerships between public libraries and other organizations in the provision of computer and networked based services.
- Were it not for the E-rate awards many libraries would not have been able to upgrade their infrastructure, expand access to networked services in the library's community, or otherwise supported a range of applications since local monies could not have been obtained for such purposes.
- These programs (and especially the E-rate) while frequently constituting only 1% or less of the library's budget provided discretionary monies and significant flexibility that could not otherwise be obtained from local monies.
- Although the agony of the process and procedures for obtaining E-rate awards was often described as "onerous and abnormally time consuming," most participants were willing to spend the staff time to obtain the awards.
- There is considerable concern that these (or additional/replacement) programs continue for future upgrades and program development.

In short, the site visits demonstrated the unique relationships among these various funding programs and the degree to which libraries have been able to leverage them against each other and to other organizations successfully. Moreover, the participants had a wealth of data and stories to support their point of view.

Importance of Leveraged Funding

A key role that the state libraries played in securing funding to advance library connectivity and IT infrastructure was to recognize early the ability to support and leverage various funding streams in a coordinated way. To this end, the state library used LSTA money in a number of E-rate supporting approaches by:

- Providing LSTA money to non-connected public libraries for connection costs, connectivity costs for the first year, and a workstation. They also helped install the equipment and provide technical support. Libraries, however, had to apply for E-rate to get the equipment and support;
- Creating LSTA-based grants for enhanced public access Internet connectivity and equipment; and
- Linking library service requirements to the grants, e.g., increasing library hours.

Into this mix entered the Gates Library Foundation (GLF) grants. This funding program provides computers, networking equipment, and software for libraries that serve impoverished communities (as defined by the GLF).

The combination of E-rate and LSTA proved powerful, with the state libraries taking advantage of LSTA's flexibility and the E-rate's targeted discount structure. By coordinating the two programs, the state libraries were able to:

- Create a whole program by linking the funding, purpose, and intent of the initiatives; and,
- Stretch the relatively small amount of funding provided by LSTA and E-rate discounts to create a larger connectivity and IT infrastructure impact throughout the state; E-rate allowed LSTA money to go much further than it ever would.

At the local level, local libraries were able to leverage state and federal funds to secure additional local funding for Internet connectivity and technology.

Additionally, the funding opportunities made possible through the various grant and discount programs created an atmosphere of cooperation between schools, libraries, and social agencies. The initiatives provided the means through which the various organizations to engage in constructive, collaborative dialog.

Impacts and Benefits

Participants were quick to identify several key benefits and impacts of the E-rate, LSTA, and GLF funding triad. These include the:

- Requirement for IT plans. Were it not for the IT plan requirement of the E-rate, many libraries throughout the state would never have engaged in a thoughtful process for IT and Internet development in their libraries.
- Impetus for a statewide drive to develop an IT infrastructure throughout each state.
- Enhanced connectivity speeds, connections, and public access equipment. As noted later in this write-up, Colorado has not witnessed lower connectivity costs but, rather, the discounts have enabled libraries to connect or enhance their existing connectivity.
- Ability to bridge geography, ethnicity, socio-economics through the funding programs. Thus, the combination of E-rate, LSTA, GLF, and state programs serves as an overall equalizer to the Digital Divide.

These serve as powerful benefits as these states was able to engage in statewide technology planning, overall increase connectivity speeds and connections, augment public access Internet services, and equalize access to network-based technologies.

Issues and Barriers

The E-rate, LSTA, Gates, and state-provided Internet and IT funding is not without its problems, however. While Colorado libraries and the Colorado State Library (CSL) continue to support IT infrastructure and connectivity initiatives and work towards connectivity and infrastructure goals, issues still remain that require resolution.

Library Issues

Participants indicated that there are a number of issues that libraries face in the networked environment and securing funding. These include the:

- Sense of smaller libraries of "why should we bother doing this"? The applications are a substantial amount of work (even with state library and regional system support) and the pay off is relatively small.
    - As a consequence, some participants concluded that the Digital Divide WIDENED. That is, some libraries simply opted out. As one participant noted, some places "looked at the opening bar, and said that it was too high."
- School libraries don't necessarily see the benefits of the discounts since the discounts go to the school administration and not the media centers.
- Libraries are not necessarily able to take advantage and implement the technologies for which they have received grants and/or discounts. In many cases, the regional systems have wired libraries for them, and continue to assist libraries in various technology-related ways.
- The E-rate application forms still remain too complex for many libraries. As such, the state or regional systems complete the forms for the libraries.
- Many libraries would never take advantage of the grants and discounts without the efforts of state library and regional systems.
- Not all libraries are benefiting from the E-rate. As one participant noted, "Very few programs help all people."
- Smaller libraries may not be savvy enough to really engage in IT planning, but they are the ones that need it the most.

While these are substantive issues and barriers that libraries encounter, none of the participants indicated a discontinuance of the various funding initiatives. Rather there was a sense of the need to engage in more awareness and support at the state, regional, and local levels.

Telco Issues

All participants identified key issues that require resolution at the local exchange carrier (LEC) level in the state. For example:

- Some LECs "don't care about working with libraries to participate in E-rate," as one participant noted. As a result, these LECs are not ready and/or willing to facilitate the discount process.
- One LEC requires a 17-page application for local telephone service. As a result, the library in that service exchange doesn't have a telephone.
- Colorado is home to one of the only LECs in county that refused to get an ID number to participate in the E-rate process. The FCC had to threaten that LEC with license loss to get to compliance.
- There is a mixed service bag at best beyond the I-25 corridor in Colorado and outside major population areas in Florida.

Thus, there are some fundamental telephone and LEC-based service issues that require resolution in these states. These are a particularly pressing issue in rural areas.

Possible Models

As a result of the site-based data collection efforts with participants from Florida and Colorado we have developed some preliminary models that depict (see Appendix C):

1. *Overview of Revenue Stream Impacts*. This figure provides the broad view of the key research question that the study addresses – relating funding inputs to benefits/impacts on the library and community.
2. *Revenue Stream Migration Patterns*. This figure depicts the various funding inputs for technology that might come to libraries and shows how they might be linked to expenditures on technology infrastructure.
3. *Relating Data Sources to Benefits/Impacts*. This figure builds on the previous figure but suggests a range of impacts and benefits that were identified by participates at the sites.

These models are preliminary but provide a general sense of the types of data and approaches that can be used for data collection in later Stages of the project. In addition, the models help provide a better sense of the nature of the study and were validated by participants during the site visits.

The investigators presented these models and some of these preliminary findings at the E-rate Task Force Meting at the American Library Association Annual Conference in Chicago, July 8, 2000. The audience at that meeting indicated general agreement with these findings, based on their personal experience. Indeed, a number of attendees volunteered their states to participate in Stage II activities. Thus, there appears to be some considerable support for continuing the project from participants at this meeting.

Conclusions

The investigators have determined that assessment of the Gates and SLD datasets to address study goals is problematic (see Appendix A). The preliminary analysis identifies

a number of possible strategies as well as some additional issues that would need to be resolved. Additional study team time would need to be committed to this effort. Yet after such commitment it is unclear how much additional useful information we would gain that would directly assess the original research questions and study goals.

The analysis of the SLD publicly available datasets from their websites has been time-consuming and a significant level of effort could be committed to re-compiling that data for additional assessment. Further, there are a number of questions regarding the accuracy, reliability, and validity of the SLD datasets as they appear on their websites (see Appendix A).

The study team also concludes that there are a number of issues and problems (from the point-of-view of the library community) with the administration of the E-rate program. Some of the participants in the data collection identified problems related to obtaining timely responses from SLD, overly bureaucratic and time consuming procedures, complicated forms, and receiving relatively little discounts for the level of effort actually involved in completing the forms and procedures. While most participants thought the "agony" of the process and forms was worth the return, some did not. Recommendations can be provided to the SLD that might minimize the level of effort and ease the burden on public libraries for requesting the discounts.

The data collection efforts in Florida and Colorado have been a veritable gold mine of information related to project issues and research questions. The investigators believe that considerable useful data and information can be obtained from these sites and other public library sites both in terms of qualitative and quantitative sources. Moreover, the investigators were impressed with the records and data sources the libraries maintained. These sites provided the investigators with a range of data and information that are still being analyzed.

The overall conclusion is that the proposed project as outlined in February 7, 2000 is feasible and can be conducted with some minor modifications. This conclusion is made in full knowledge that there may only be minimal usefulness from the various databases (e.g. SLD) assuming that we obtain the datasets we need and can commit adequate time in analyzing them.

Next Steps

The investigators reviewed the tasks as outlined in Stage II of the original proposal and suggest that (1) the study goals and research questions remain as originally stated, but that (2) tasking for Stage II be modified as follows:

Stage II would occur from September 1, 2000 through February 28, 2001 and would involve:

- **Phase I: September 2000-October 2000**. Develop expanded case study methodology. Develop and pre-test case study protocols. Finalize case sites (estimated 6-8 state libraries and public libraries). Finalize methodology to identify and measure benefits and impacts from networked information services.

- **Phase II: November 2000 - January 2001**. Conduct case sites. Visits likely to require 3-4 days and will include data collection with librarians and state/local government officials. Modify data collection tools as necessary based on findings in each site.

- **Phase III**: **(Ongoing).** Update analysis of SLD databases and other pertinent databases as needed. The level of effort to be committed to this effort would depend on further conversation with the ALA Washington Office.

- **Phase IV: February 2001**. Conduct a national by invitation only conference to review preliminary findings and develop policy recommendations related to the E-rate program and the reauthorization of LSTA.

  Complete a written report of Stage II data collection activities and findings. Report to include models that describe components related to benefits and impacts resulting from public library provision of networked services and policy recommendations.

Given the preliminary findings from Stage I, the study team recommends that some additional effort be given during Stage II to demonstrate the importance of the interaction and leveraging of E-rate, LSTA, and Gates programs on public libraries' impact on the digital divide. Data and policy recommendations should be developed as part of Stage II that can be useful for setting a national agenda for funding public libraries to support a range of Digital Divide issues. These policy recommendations can be especially useful as a new administration and Congress takes office in January 2001.

The investigators are prepared to develop a detailed discussion of budget, tasking, and products for Stage II assuming the ALA Washington Office wishes to proceed with Stage II. We believe that completing Stage II is eminently feasible and will provide important data and policy recommendations to help shape a national agenda to support the role of public libraries in providing increased access to networked information and reducing the impact of the Digital Divide on the American public. Such data and policy recommendations will be especially important as a new administration and congress take office in January 2001.

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APPENDIX A
REPORT ON AVAILABLE DATA FROM THE SCHOOLS AND LIBRARIES DIVISION (SLD) AND THE GATES TECHNOLOGY INVENTORY (GTI)

Introduction

As part of Phase I of the study, the researchers proposed to examine, analyze, and present findings from a number of existing datasets relevant to understanding the role of public libraries in the Digital Divide. These datasets included the E-rate application and disbursement data maintained by the Schools and Libraries Division (SLD) of the Universal Service Administration Company (USAC) and the Gates Library Foundation (GLF) data regarding public library technology infrastructure and disbursements in GLF states (Gates Technology Inventory – GTI).

As discussed in the main text of this report, the researchers encountered a number of issues in gaining access to the SLD datasets. Thus, the researchers remained unable to actually analyze findings from the raw data owned by the SLD. The researchers, however, conducted an assessment, as best they could, of the publicly available data from the SLD website. It should be noted, however, that any analysis presented relies solely on what the SLD makes available on its web site – most of which is not in database-compatible format ready for analysis.

The GTI data represent the 31 states in which the GLF provided public libraries with grants. To date, there are three waves of GLF funding. The GLF required each public library in the selected states to complete a technology inventory of its computer, network, and Internet infrastructure. These surveys were compiled into a database. It should be noted, however, that year 1 states completed a substantially different GTI than did year 2 and 3 states. As-such, analysis presented in this appendix relies on year 2 and 3 datasets.

Key research questions that guided the assessment and analysis of both the SLD and GTI data included:

- Can these data reveal a profile that describes the nature of public library E-Rate and Gates applications and expenditures? In other words, who is applying?
- What are they spending grant money on?
- How much of the disbursements have gone to communities with what poverty levels?
- What general types of categories of expenses have been supported by the disbursements?
- Can we say that rural libraries primarily need basic telecom and urban libraries need a greater quantity of equipment?
- Is there a basic assumption that some libraries have more, faster, or better Internet access?
- Can we say that certain kinds of libraries have some consistent sources of funding and, therefore, are applying for other kinds?
- Which libraries are not applying, and what do they look like in terms of population and poverty?

This appendix attempts to highlight some of the questions these data can answer. It provides a set of instructions on mining the data within the above-mentioned sources.

PART I: CONTENT ANALYSIS

SLD Available Data

Some publicly available data resides on the Schools and Libraries Division (SLD) web site at URL *http://www.sl.universalservice.org/*. On the home page is a button with the selection, "Funding Data" which leads to the URL *http://www.sl.universalservice.org/apply/funds.asp*. On this subpage is a hyperlink to each of the years of funding since the beginning of the Universal Service Program; specifically, Year 1 (funds expended from January 1, 1998, through June 30, 1999); Year 2 (funds expended from July 1, 1999, through June 30, 2000); and Year 3 (funds committed for expenditure from July 1, 2000, through June 30, 2001).

Each year's hyperlink leads to several data choices; for example, background information, state-by-state funding reports, at-a-glance summary statistics of national data, etc. The data relevant to this study resides in the SLD *State Funding Reports* for each year.

Location and Extraction of Year 1 Data

Year 1 Funding data resides at *http://www.sl.universalservice.org/apply/fcyear1/state.asp*. This dataset contains the following elements for each of the 50 states, plus the District of Columbia and five US territories (56 in total):

- Aggregate funding (total dollars expended for each state);
- Adobe Portable Document Files ("[stateabbr].pdf") data files for PC and Macintosh platforms; and,
- Self-executing, zipped tab-delimited text files ("[stateabbr].exe") for PC and Macintosh platforms.

The process of extracting Year 1 datasets from the SLD web site can be described as follows, employing a Windows platform and Microsoft computer software:

- One of state hyperlinks ("[stateabbr].exe") is selected;
- The accompanying file is saved (downloaded) to a hard drive;
- Each file is selected on the hard drive and auto-decompressed to a desired location;
- Each file is opened with Microsoft Excel (or other spreadsheet software);
- Each file is converted from tab-delimited format ("[stateabbr].txt") to Excel software format ("[stateabbr].xls"); and,
- Each file is saved under a desired name.

These steps must be accomplished for each of the 56 states/territories before further data analysis can be accomplished. This process will yield a series of spreadsheets that can be either aggregated into a single spreadsheet or exported to a relational database format.

The number of cases in each file is determined by the number of libraries or library consortia that applied for E-Rate funding during the Year 1 filing window.

Content Analysis of Year 1 Data

Year 1 data files contain the following information for each of the 56 states, territories and District of Columbia:

- Name of Applying Entity;
- Street Address;
- City, State and 5-digit Zip Code;
- Total Year 1 Funding Allotment;
- Category of Applicant (School, School District or Library/Library Consortium);
- Type of service being funded (Telecomm and Dedicated, Internet Access or Internal Connections);
- Discount Percent; and,
- Funding Wave.

Location and Extraction of Year 2 Data

Year 2 Funding data resides at *http://www.sl.universalservice.org/apply/fcyear2/state.asp*. This dataset contains the following elements for each of the 50 states, plus the District of Columbia and four US territories (55 in total; note that Guam did not participate in Year 2 applications):

- Aggregate funding (total dollars expended for each state);
- Adobe Portable Document Files ("[stateabbr]Year2cum.PDF") data files; and,
- Zipped tab-delimited text files ("[stateabbr]Year2cum.zip") for PC and Macintosh platforms.

The process of extracting Year 2 datasets from the SLD web site is similar to the process for the Year 1 dataset, described above, with additional resident software required to decompress the compressed files.

The number of cases in each file is determined by the number of libraries or library consortia that applied for E-Rate funding during the Year 2 filing window.

Content Analysis of Year 2 Data

Year 2 data files contain slightly different information for each of the states, territories, and District of Columbia than is contained in the Year 1 set:

- Name of Applying Entity;
- Type of service being funded (Telecomm and Dedicated, Internet Access or Internal Connections);

- Street Address;
- City, State and Zip Code;
- Total Year 2 Funding Allotment; and,
- Discount Percent.

Notably absent in Year 2 datasets is the Category of Applicant (School, School District, or Library/Library Consortium). In addition, the column for Funding Wave does not appear in Year 2. Without the classification information of type of entity, Year 2 data analysis is likely to be somewhat more limited than Year 1, as in Year 1 libraries can be clustered with simple data sorting. For Year 2 data, distinguishing public library applicants from schools and school districts will require far more effort; library names could be confirmed with the Federal-State Cooperative System for Public Library Data (FSCS) lists by state.

Location of Year 3 Data

Year 3 Funding data resides at *http://www.sl.universalservice.org/funding/y3/waves/default.asp*. This dataset contains only 49 entities, as several of the territories, the District of Columbia, and a few states apparently failed to apply during the Year 3 application window. The Year 3 data is available only in Adobe Portable Document Files (.PDF) data files of Microsoft Access reports for each state. Hence, Year 3 data is available for analysis *only* if it is re-keyed state by state into spreadsheet or database software.

Individual Form 470's at SLD web site

Individual Form 470's from applying libraries are available at URL *http://www.sl.universalservice.org/menu.asp,* following the hyperlink to "Apply Online View Forms". Within each funding year, libraries' application data can be accessed by entering limited search criteria (for example, "Type: Library/Consortium" together with "State: MI" and "Patrons: greater than 1000" will yield several pages of Michigan library application data). The choice to "Review Selected Application" is then selected for each individual library, and data could be cut and pasted into Excel.

Given the laboriousness of Form 470 data extraction, this method would yield analyzable data only after considerable effort. The specific data contained within Form 470 that could justify this effort would be the breakdown for each of the three categories of eligible services, i.e., Telecomm, Internal Connections and Internet Services. [The Eligible Services List is available at *http://www.sl.universalservice.org/download/es1299.pdf.*]

Individual Form 471's at SLD web site

Form 471's cannot be accessed on the web site except by individual entities filing for E-Rate discounts.

Content Analysis of Gates Technology Inventory

The Gates Technology Inventory (GTI) was undertaken by the Bill and Melinda Gates Foundation in order to assess a state's readiness to expand public access to information technologies. Data collection by the Gates Foundation has been moving forward steadily since mid-1997. Gates data provides the most comprehensive inventory of public library information technologies compiled by anyone to date. Taken together, these datasets offer a remarkable opportunity to describe, assess, and catalogue the nation's public library technology preparedness and their potential impact on the Digital Divide. The Gates Foundation data collection can provide a snapshot of public library information capability on the cusp of the 21st century.

Data from Gates Foundation Round 2 and Round 3 collections were made available to the study team by Gates Foundation staffers. They were delivered electronically in a series of 27 Microsoft Access database files, one for each state that completed a GTI as a prelude to applying for Gates Learning Foundation funding from 1999 through 2002. These state GTI databases contain a case for each public library. The databases appear in Table 1 together with the number of cases in that database:

Name of Database	Number of cases
Arizona	163
California	1,047
Colorado	251
Florida	465
Georgia	359
Hawaii	50
Idaho	134
Illinois	783
Indiana	428
Maine	274
Michigan	666
Minnesota	362
Missouri	396
Montana	106
New York	1,073
North Carolina	383
North Dakota	89
Ohio	701
Oklahoma	193
Pennsylvania	666
South Carolina	182
South Dakota	132
Tennessee	290
Texas	790
Vermont	201
Virginia	351
Wyoming	78

Table 1

Thus, data analysis can be performed on over 10,000 US public library outlets in the Gates datasets.

Table 2 lists the content of each Gates database:

Field Name	Description
LibName	Library Name
Address, City, State, Zip, Zip4, County	Address, City, State, Zip, Zip4, County
Phone	Telephone Number
Fax	Fax number
URL	URL
Out_type	Type of outlet (Central or Branch)
Pentiums	Number of PC's in Library Building (Running Windows 95/98/NT) Total Number of Pentium 90 or better PC's, with 16MB or better (all uses)
PACPentiums	Of that total, number designated for public access (not including OPAC)
OPACPentiums	Of that total, number designated for OPAC access only
OPACVendor	Library OPAC system Make (Vendor)
OPACModel	OPAC Model [Version]
LAN	Library Building LAN or WAN: Building has LAN (Y/N)
WAN	Building is connected to a library WAN (Y/N)
CAT5	Internal Wiring: CAT 5 Cabling (Y/N)
PhoneLines	Telephone Lines: Indicate the Total Number of Telephone Lines into the Building
DialUp	Internet Connection For Public Access: Dial up (Y/N)
NoDialUp	How many Dial-up connections
DialUpSpeed	Speed of Dial-up connections
Dedicated	Dedicated Leased Line (Y/N)
DedicatedSpeed	Speed of Dedicated Leased Line
DedicatedType	Type of Dedicated Leased Line (ISDN, Frame Relay)
TechPlanApproved	Has Approved TechPlan (Y/N)
LIB_ID	Internal library system identification number (GTI-assigned)
Building_ID	Unique internal library outlet identification number
Closed	Is this branch closed?
K_DECTOP	Outlet identification code assigned by NCES. Outlets of an administrative entity have the same K_DECTOP code as their administrative entity
LIB_CODE	Outlet identification code assigned by the state
K_SEQ	Outlet's unique three-digit suffix to K_DECTOP code, assigned by NCES

Table 2

PART II: POTENTIAL DATA ANALYSIS

Potential Data Analysis of SLD Year 1 and Year 2 Data

Following the designation of each applicant as a library or library consortium for Year 2 data (see Content Analysis of Year 2 Data, above), a variety of analyses could be performed on Year 1 and Year 2 SLD data on a stand-alone basis. These include, but are not limited to:

- Analysis of E-Rate funding by state, i.e., how much money was allocated to each state for each category of service? Did Iowa receive significantly higher amounts for Internet access than New Mexico? Is there a national or regional priority of requested services for the three categories of eligible services? [See Attachment 1 for a sample analysis of aggregate national data]
- Analysis of E-Rate eligible services by poverty level, i.e., are there discernible trends in what services are being applied for as indicated by discount band? For example, do poorer libraries seem to apply for internal connections at a higher rate than for telecommunications services?
- Analysis of applicant by poverty level, i.e., are libraries in all socio-economic strata represented in E-Rate funding? Are large numbers of poorer libraries missing due to a burdensome application process? In this analysis, the study team will be alert for gaps in the data picture.
- Comparison of Year 1 data with Year 2 data. Any of the above analysis is suitable for year-to-year comparison analysis.
- Analysis of funding waves (Year 1 data only), i.e., is SLD funding steady or fitful? Was any wave (i.e., funding period) in Year 1 conspicuous and why?

Potential Data Analysis of Year 1 and Year 2 Data with Additional Datasets

- Analysis of participation. E-Rate applicants per state as a percentage of total eligible applicants. Are there trends here? Has this changed from year to year? More data would be required; specifically, how many total public libraries are in a given state, as indicated by the most recent FSCS dataset.
- Analysis of funding relative to demographic features by zip code. Recent demographic information (ethnic make-up, income levels, household status, etc.) could be geocoded to zip code, then analyzed together with funding levels. [Note: additional geocoded datasets may be available to study team (see Jue, et al.)] Furthermore, urban/rural designation could be attached to each library entity to further analyze the need for telecommunications, internal communications and Internet access in populated versus unpopulated areas.

Potential Data Analysis of Year 3 Data

Year 3 data cannot be analyzed until provided in a format that can be edited and manipulated. With potentially more than 5,000 public library E-Rate applications in Year 3, re-keying data from PDF format appears unlikely.

What Is Not Possible In SLD Data Analysis

The following is a list of analyses that cannot be performed solely from publicly available SLD data:

1) Which public libraries have applied for E-Rate discounts and were rejected, and on what criteria (administrative, eligibility, etc.)
2) We do not know to what extent applications were funded; that is, how many applications were fully versus partially funded?
3) It is also impossible to ascertain the market value for E-Rate services, which were purchased with E-Rate funds, nor the discounts on commercial rates offered by service providers. With this in mind, the study team will be wary of equating funding levels with actual need.
4) We cannot determine which services specifically are being purchased with the E-Rate discount under each category of service (e.g., analog voice service, Category 5 LAN wiring, satellite connections, and so forth). In other words, it's impossible to get a picture of which telecommunications, Internet and infrastructure services are most needed by public libraries.
5) Longitudinal analysis from Year 1 to Year 3 remains impossible at present due to the data extraction difficulties of Year 3 data.
6) Without a breakdown from the SLD directly, we do not know what libraries are represented in each library consortium applicant, nor if libraries are consistent in applying as members of a consortium or as independent entities.

These are significant questions/and or issues to which answers/resolution would be useful to this study.

Potential Data Analysis of Stand-Alone GTI Data

In and of itself, the GTI can provide baseline data on technological readiness, telecommunications infrastructure, type and speed of access to the Internet, and public access computing in public libraries. For some data analysis, it is recommended to aggregate the individual state databases; for other purposes, such as merging with other datasets, it would be preferable to leave them intact as separate state files until the matches are concluded. Suggestions include, but are not limited to:

- Strengths and weaknesses of public library computing capacity (number of Pentiums available for public use) by region, state and nationally;
- Strengths and weaknesses of public library infrastructure (LAN/WAN wired outlets; presence or absence of Category 5 cabling; telephone lines into outlets) by region, state and nationally; and
- Strengths and weaknesses of public library Internet access capacity (type and stability of line; speed of access) by region, state and nationally.

Potential Data Analysis of GTI Data in Conjunction with FSCS Datasets

The GTI datasets contain a critical data element for merging with other datasets. Specifically, the final three fields listed in Table 2, K_DECTOP, LIB_CODE, and K_SEQ will, presuming these have been correctly assigned, enable the cases in the GTI datasets to be affiliated with cases in the FSCS datasets. The most current FSCS dataset (released in July 2000, and available at *http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2000315*) is for FY1997.

Once the two datasets have been linked through these fields, technological capabilities of individual libraries and library outlets can be analyzed in relation to, at a minimum:

- Size of library Legal Service Area population (LSA), i.e., are certain sized libraries over- or under-represented in the GTI?
- Number of FTE staff, i.e., is applying for GTI a luxury only well-staffed libraries can afford? Is a proactive state library agency a factor in the Gates application process? If so, what impact are the Gates grants having on the Digital Divide?
- Operating Income (totals and by local, state and federal sources).
- Number of electronic materials and access information.
- Various Expenditures (Total Expenditures, Operating Expenditures, Electronic Expenditures, etc.).

Such crosstabulation analysis would provide useful data regarding the GLF and E-rate initiatives.

Potential Data Analysis of GTI Data in Conjunction with SLD Datasets

At this point, the SLD and GTI datasets have no common numerical or text identifier. Library names are inconsistent between the datasets. Telephone numbers were considered as a potential link, being unique and not given to rapid change, but the SLD dataset does not include telephone numbers. If the SLD zip code data contained the "plus four" digits, it would be worth exploring whether the library 9-digit zip code could serve as a unique, linkable field and facilitate the merge of the two critical datasets.

Additional Data Requests for Study Purposes

The study team is in urgent need of additional current data and modified data design in the future, namely:

- SLD files to contain FSCS library codes for main and branch libraries;
- SLD files to contain zip code plus four information;
- SLD Year 3 data in manipulatable form as soon as possible; and,
- Gates Foundation award data by state and library.

Conclusion

The question of public libraries' impact on the Digital Divide remains essential to better understand and clarify. The assessment of the SLD and GTI data can assist in providing selected answers to the question of public library impact on the Digital Divide when viewed in the context of a larger study. The researchers attempted to frame some initial research areas that could be explored by the study team and other library researchers by the publicly available SLD and GTI data in their present form. These questions included the:

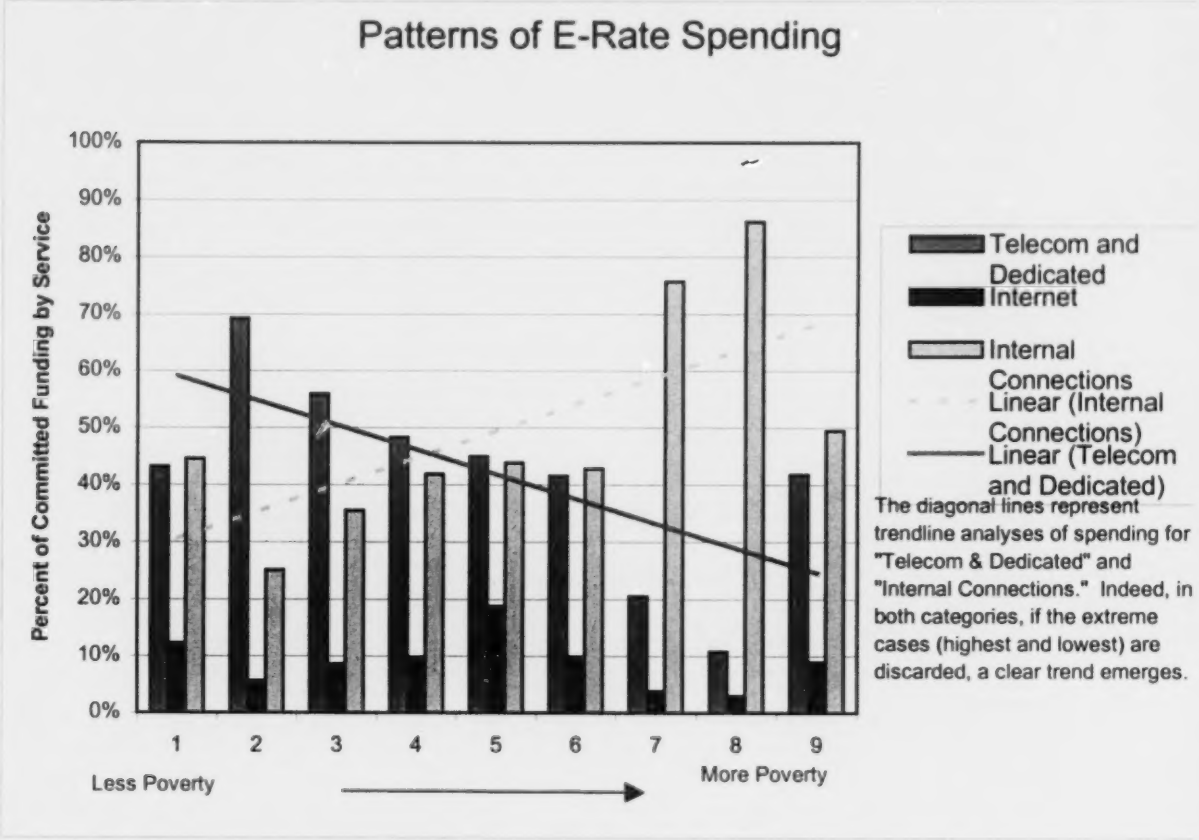
- Analysis of E-Rate funding by state;
- Analysis of E-Rate eligible services by poverty level;
- Analysis of applicant by poverty level;
- Comparison of Year 1 data with Year 2 data;
- Analysis of funding waves;
- Analysis of participation; and
- Analysis of funding relative to demographic features by zip code.

Such analysis would provide useful application, participation, infrastructure, and disbursement data.

The reality is, however, that it will take substantial effort, time, and expertise to prepare the publicly available SLD and GTI data to yield real results and highlight trends in public library technology needs, capabilities, and impact of the various funding efforts. The researchers, in conjunction with the ALA Washington Office, continue to pursue avenues to gain access to the raw SLD data rather than the limited data publicly available from the SLD web site. It is the hope of the researchers that they will gain access to this data during the ensuing phases of this study.

The study team extends its deep appreciation to the Schools and Libraries Division and the Bill and Melinda Gates Foundation for their data collection efforts and their generosity in sharing those data, and urges further collaboration in this vital arena.

ATTACHMENT 1



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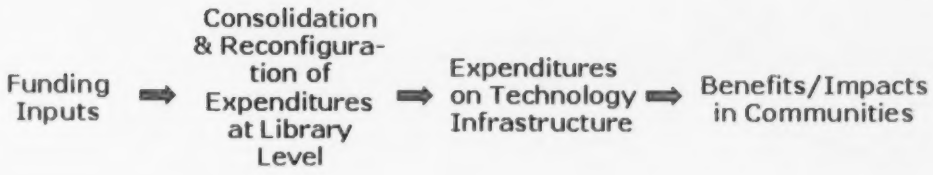
APPENDIX B
RESEARCH QUESTIONS AND STUDY AREAS

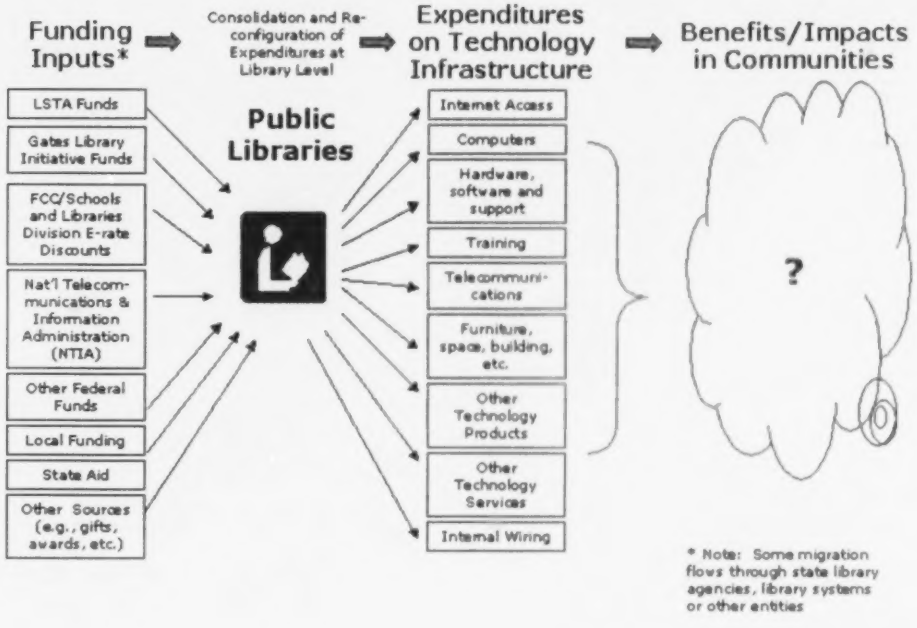
Proposed Study Research Areas, Research Questions, and Data.		
Research Area	**Research Questions**	**Type of Data**
Library Organization and Management	• What is the effect of Internet connectivity on library staff? • What are the core skills necessary for librarians to work effectively in the networked environment? • How are libraries organizing/reorganizing as a result of the transition to the networked environment? • Does the provision of networked services in libraries require new management and service provision techniques? • What is the impact of the Internet on library strategic and/or other planning activities? • Does the networked environment offer/determine new roles for libraries? • Are new library/community organization partnerships developing as a result of library Internet connectivity? • What are the costs to libraries for providing network-based services? • Does the networked environment enable new library services? • Is there a shift in the *location* of library services (e.g., in-library v. remote)? • Does provision of network-based services require new library-user policies?	• Staff time, effort, workload changes • Necessary MLS and continuing education training • New organizational structures/models for management • Partnerships, collaborative models • New services/service delivery mechanisms • Planning and role setting • Costs, budgetary issues • Acceptable use policies, minor use, ADA compliance
Social Impacts	• What are the benefits users and/or particular user segments (e.g., youth, seniors, others) derive through library Internet connectivity and access to network services? • How does the larger library community (e.g., local organizations, schools) benefit from library Internet connectivity?	• Benefits/impacts of public access Internet services on users • Benefits/impacts of library Internet services/connectivity on the community
National Policy Implications	• What national policies exist to support library Internet connectivity and network services provision (e.g., LSTA, E-rate)? • To what extent do existing national policies address the *actual* needs of libraries in the networked environment as identified through data from this study? • To what extent do libraries (as opposed to other types of institutions) benefit from existing national programs to support Internet connectivity (e.g., E-rate)? • Are there other models for developing and/or enhancing library Internet connectivity from which national policy can learn (e.g., Gates, state initiatives)? • Are policy changes necessary to *best* support library Internet connectivity and network services provision?	• Assessment of key national, state, and other connectivity programs and the benefits/issues of those programs • Assessment of the benefits derived by libraries from the existing national connectivity programs • Determination of the appropriateness of national Internet connectivity programs given the state of library Internet connectivity and network service provision • Identification of recommendations for changes to national policies
Existing Data Analysis (see http://www.sl.universalservice.org/apply/fcyear2/national.asp for example analysis)	• What states (regions, Congressional districts, cities, etc.) have received what amounts of money? • How much of the disbursements have gone to communities with what poverty levels? • What general types of categories of expenses have been supported by the disbursements? • What types of libraries, size of libraries, library consortia have received disbursements?	• Various crosstabs that compare amounts of disbursements by community type, by organizational affiliation, etc. • Average disbursement for type of community, size of community, type organizational affiliation, etc. • Disbursements by library type, library size, other key library demographics

APPENDIX C
PRELIMINARY IMPACT MODELS OF PUBLIC LIBRARY INTERNET AND TECHNOLOGY INFRASTRUCTURE FUNDING

Overview of Revenue Stream Impacts


Funding Inputs
Consolidation & Reconfigura-tion of Expenditures at Library Level
Expenditures on Technology Infrastructure
Benefits/Impacts in Communities

Revenue Stream Migration Patterns



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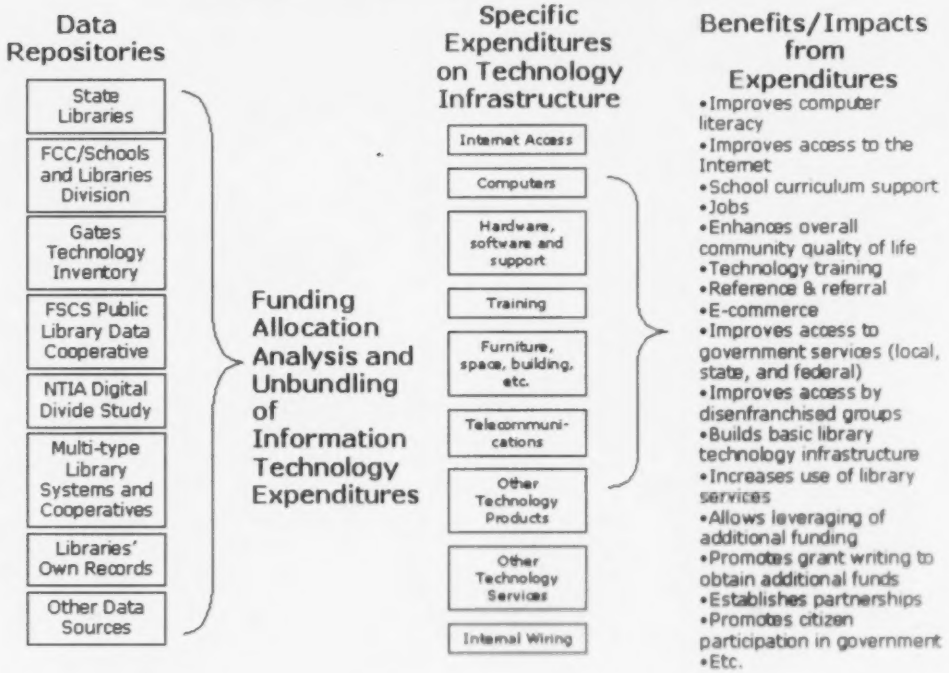
Relating Data Sources to Benefits/Impacts



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